WE CLAIM:

1. A method for obtaining stem cells from an umbilical cord matrix comprising:

(a) fractionating the umbilical cord matrix source of cells, the source substantially free of cord blood, into a fraction enriched with stem cells, and a fraction depleted of stem cells, and

(b) exposing the fraction enriched with stem cells to conditions suitable for cell proliferation.

2. The method of claim 1 wherein the source of cell comprises umbilical cord Wharton's jelly.

3. A cultured isolate comprising stem cells isolated from an umbilical cord matrix source of stem cells, other than cord blood, the isolate comprising totipotent immortal stem cells.

4. A method of differentiating stem cells to a transplantable cell, the method comprising:

(a) obtaining a totipotent stem cell obtained from a umbilical cord matrix source of cells, the source other than cord blood; and

(b) exposing the stem cell to a differentiating factor to produce a transplantable cell.

5. The method of claim 4 wherein the transplantable cell is a hematopoietic cell.

6. The method of claim 4 wherein the transplantable cell is a mesenchymal cell.

7. The method of claim 4 wherein the transplantable cell is a neuro-ectodermal cell.

8. A method of treating a mammalian subject for alleviation of a disease symptom, the method comprising obtaining a transformed cell comprising stem cells isolated from a source of such cells derived from umbilical cord other than cord blood and transplanting that cell into a human subject requiring treatment provided by the transformed cell.

9. A method of introducing a foreign gene into a stem cell, the method comprising obtaining a totipotent immortal stem cell of claim 1 and contacting that stem cell with a transforming factor comprising a foreign gene.

10. The method of claim 9 wherein the transforming factor comprises a viral vector having a gene sequence foreign to the vector and native to the stem cell.

11. A method of generating a bank of mammalian stem cells from an umbilical cord matrix, the method comprising:

(a) fractionating the umbilical cord matrix into a fraction enriched with stem cells and a fraction depleted of cells; and

(b) culturing the fraction enriched with stem cells in a culture medium containing one or more growth factors, wherein the stem cells undergo mitotic expansion.

12. The method of claim 10 further comprising tissue typing, banking and expanding the totipotent umbilical cord mesenchyme cells needed.

13. The method of claim 10 further comprising differentiating the totipotent umbilical cord matrix cells in vitro.

14. The method of claim 10 further comprising genetically manipulating the totipotent umbilical cord matrix cells in vitro.

15. The method of claim 10 further comprising passaging the totipotent umbilical cord mesenchyme cells for at least 10 times and the umbilical cells remaining stable.

16. The method of claim 10 wherein the mammalian cells are from anay placental animal.

17. The method of claim 10 wherein the mammalian cells are human.

18. The method of claim 10 wherein the mammalian cells are porcine or bovine.

19. The method of claim 10 wherein the mammalian cells are equine or canine.

20. The method of claim 10 wherein the mammalian cells are rodent.

21. A method of transplanting the transplantable cell of claim 4, the method comprising:

culturing the totipotent umbilical cord matrix stem cells in a culture medium containing one or more growth factors wherein the stem cells undergo mitotic expansion.

22. The method of claim 21 further comprising:
culturing the umbilical cord stem cells in a culture medium containing one or more growth factors for inducing the production of stem and neural cells.

23. The method of claim 21 further comprising:

culturing the umbilical cord stem cells in a culture medium containing one or more growth factors for inducing the neural cells to undergo mitotic expansion.

24. The method of claim 21 further comprising:

culturing the neural cells in a culture medium containing one or more growth factors for inducing dopamine production in the neural cells.

25. The method of claim 21 wherein the neural transplantable cell is introduced into the substantia nigra region of the midbrain in a patient with Parkinson's disease.

26. The method of claim 21 wherein the neural transplantable cells are capable of producing dopamine.

27. A method of transplanting the transplantable cell of claim 21, the method comprising culturing the umbilical cord matrix stem cells in a culture medium containing one or more growth factors wherein the stem cells undergo mitotic expansion.

28. The method of claim 21 further comprising culturing the umbilical cord matrix stem cells in a culture medium containing one or more growth factors for inducing the production of fibroblast cells wherein the fibroblast cells undergo mitotic expansion.

29. The method of claim 28 further comprising introducing the fibroblast cells into a patient.

30. The method of claim 28 wherein the fibroblast cells have a homing ability for injured tissues and assist in tissue repair.

31. A purified preparation of human UCMS cells comprising:

(a) totipotential UCMS cells derived from Wharton's jelly; capable of proliferation in an in vitro culture for over one year;

(b) maintaining a karyotype in which all the chromosomes characteristic of the human are present and not noticeably altered through prolonged culture; and

(c) maintaining the potential to differentiate into derivatives of endoderm, mesoderm or ectoderm tissues throughout the culture.

32. The stem cells of claim 31 wherein the stem cells are capable of being typed, banked or expanded.

33. The method of claim 31 further comprising:

culturing the neural cells in a culture medium containing one or more growth factors for inducing neuron differentiation and maturation.

34. The method of claim 33 wherein the differentiated and mature neuron is introduced into the central nervous system of a patient.

35. The method of claim 33 further comprising:

culturing the neural cells in a culture medium containing one or more growth factors for inducing glial cell differentiation and maturation.

36. The method of claim 33 wherein the differentiated and mature glial cell is introduced into the central nervous system of a patient.

37. The method of claim 33 wherein the differentiated and mature glial cell is introduced into the spinal cord of a patient.

38. A stem cell culture comprising a stem cell population and a feeder cell population, the culture comprising:

(a) mammalian stem cells capable of proliferation in an in vitro culture for over one year;

(b) a feeder cell population comprising mammalian UCMS cells, said feeder cells incapable of beginning or conducting a mitotic process, but capable of providing growth factors;

(c) maintaining a karyotype in which all the chromosomes mammalian characteristics are present and not noticeably altered through prolonged culture; and

(d) maintaining the potential to differentiate into derivatives of endoderm, mesoderm and ectoderm tissues throughout the culture.

39. The stem cell culture of claim 38 wherein the stem cells are capable of being typed, banked or expanded.

40. The stem cell culture of claim 39 wherein the stem cells and the feeder cells are of human origin.

41. The stem cell culture of claim 39 wherein the matrix of UCMS is capable of delaying differentiation.

42. A method involving the use of the matrix or condition media to establish and maintain stem cells.

43. A method involving the use of the UCMS cells to generate transgenic or chimeric animals.